

## EXPANDABLE POLYMERIC FIBERS AND THEIR METHOD OF PRODUCTION

### ABSTRACT OF THE DISCLOSURE

5        The present invention is directed to thermo-expandable fibers and to the expanded  
hollow fibers or microtubes, microcellular foam or foamed composite material that results  
upon heating the expandable fibers. The thermo-expandable fiber of the present invention  
is characterized by having a polymeric wall surrounding one or more pockets or particles of  
blowing agent or propellant within the fiber. The polymeric wall may have reactive  
10 functional groups on its surface to give a fusible fiber. When the expandable fibers are  
heated, they expand to form hollow fibers or microtubes comprising polymeric shells  
surrounding one or more internal gaseous voids, and when the fibers are expanded while  
in contact with each other, a microcellular foam may be formed. The foam consists of a  
plurality of hollow fibers fused together, optionally aided by functional groups present on  
15 the surface of the heated fibers that act to crosslink the material. When expandable  
microspheres are mixed with a matrix, which can optionally react with functional groups on  
the fiber surface, and the resulting combination is heated, the fibers expand to give a  
foamed composite material in which the hollow fibers or microtubes may optionally be  
fused or chemically crosslinked to the matrix.